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Cheiracus sulcatus, a newly found invasive eriophyoid mite damaging rice in Guangdong Province, South China

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Abstract: An invasive eriophyoid mite was newly found damaging rice plants in Shaoguan City, Guangdong Province, China for the past two years. First reported in northern Thailand, the mite *Cheiracus sulcatus* Keifer might invade China in recent years and has caused serious damage to rice in Guangdong. The mite is re-described, illustrated and its symptoms on rice are presented. Pest risk analyses and suggestions are made to remind local technicians and farmers of the risk of this mite spreading across southern China, southwestern and eastern China.

Key words: *Cheiracus sulcatus* Keifer; rice; eriophyoid mite; invasive species; China

The Eriophyoidea are phytophagous mites attacking many plants, among which are economic crops. Eriophyoid mites can infest various plant parts such as leaves, buds, stems and fruit. Living on host tissues, mostly on leaves, they can cause direct damage including galls, erineum, blisters, brooming, leaf rolls, various deformations and discoloration (rust) to host plants, and indirect damage by spreading viruses (Hong and Zhang, 1996). Although eriophyoid mites are usually important as fruit tree pests worldwide (Jeppson *et al*., 1975), three species have been reported from rice in the Philippine Islands (Keifer, 1963), Kenya (Keifer, 1968), and Thailand (Keifer, 1977). The eriophyid mite *Abacarus oryzae* Keifer was found in the Manila District in the Philippines; these were evidently rust mites and were said to have come from plants affected with a dwarf disease called "tungro" (Keifer, 1963). Found in Kisumu, Kenya, another eriophyid *Aceria bakkeri* Keifer probably occurred in the leaf sheaths (Keifer, 1968). These two eriophyid mites belong to the family Eriophyidae, while the third eriophyoid mite, *Cheiracus sulcatus* Keifer is in the family Diptilomiopidae. The mite was first found in Ban Pa Ha, Chiang Rai Province, northern Thailand, bordering Laos and Myanmar. The mite lives on leaf blade undersides. Apparently no or little damage results from their feeding (Keifer, 1977). It has also been found widely distributed in Tamil Nadu in southern India, apparently causing no damage (Mohanasundaram, 1981). In the past two years, an eriophyoid mite has been found damaging rice in Shaoguan City, Guangdong Province, South China. The mite was collected and identified as *Cheiracus sulcatus* Keifer by us. This is the first report in the world of this mite damaging rice seriously. The purpose of this study is to identify and re-describe the mite, to test the ability of the mite to transmit rice virus disease, and to help local farmers know what causes the symptoms and how to control the mite. Its possible dispersal within China and potential damage to Chinese rice production are also analyzed.

Redescription of the mite

The mite was first described by Keifer. We noticed that the mite found in China is much bigger than the same species found in Thailand. Furthermore, the description by Keifer was not sufficiently detailed. The eriophyoid mite was re-described based on the Chinese specimens. The measurement unit is in micron.

***Cheiracus sulcatus* Keifer, 1977** (Figs. 1 – 6)

Female: Body fusiform, 210 – 230 long, 67 wide, 64 thick, color in life golden to brown. Opisthosoma 40, projecting down. Prodorsal shield with small frontal lobe, prodorsal shield 42 long, 60 wide; design on prodorsal shield obscure, median line indicated by faint lines or thickenings on rear 1/4, admedian lines apparently indicated as running from sides of anterior lobe, obscure anterior, submedian lines absent. Dorsal tubercles somewhat ahead of rear shield margin, 15 apart, scapular setae (*sc*) 5 directed diagonally

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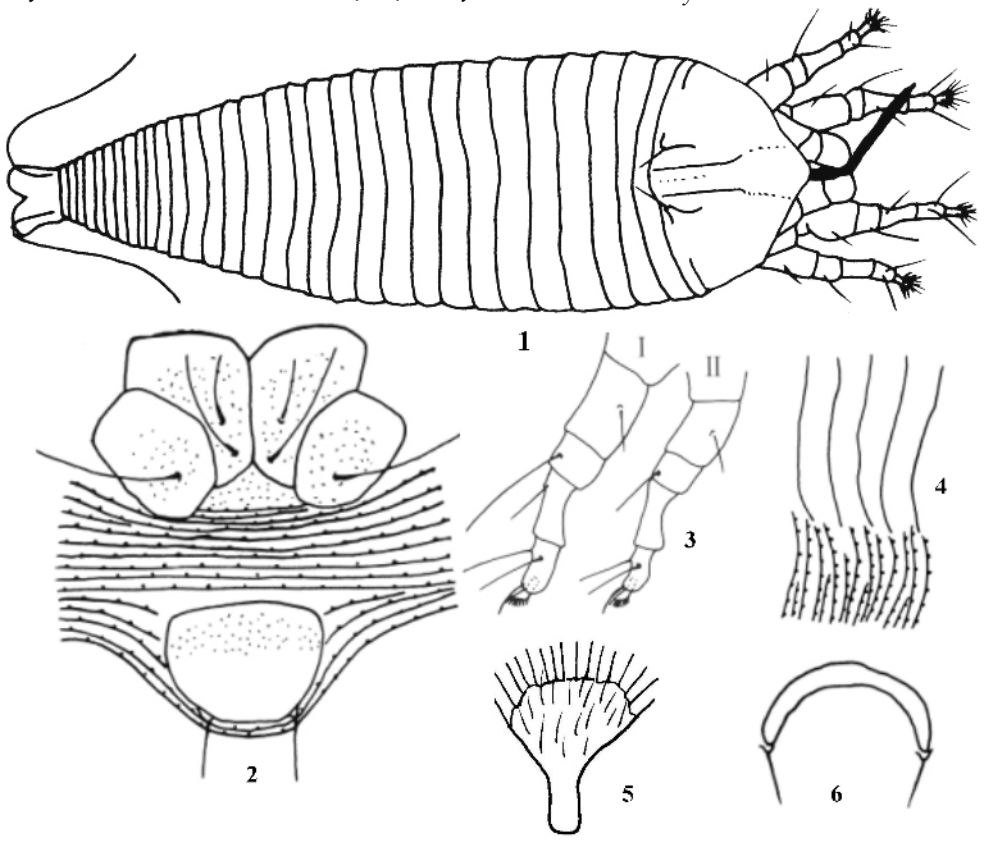
centered to rear. Coxal area with microtubercles; sternal line present, anterolateral setae on coxisternum Ⅰ (1*b*) 12, proximal setae on coxisternum Ⅰ (1*a*) 22, proximal setae on coxisternum Ⅱ (2*a*) 70. Legs Ⅰ 40 long, femur 12, basiventral femoral setae (*bv*) 10; genu 5 long, antaxial genual setae (*l*″) 30 long; tibia 12, paraxial tibial setae (*l*′) 9, located 1/3 from dorsal base; tarsus 8 long; empodium with about 16 rays around margin, many internal branching rays, empodium not divided but displaying no definite central stem, only a pad, solenidion without knob. Legs Ⅱ 35 long, femur 10, basiventral femoral setae (*bv*) 11; genu 6 long, antaxial genual setae (*l*″) 11 long; tibia 10; tarsus 8 long. Opisthosoma with 22 dorsal annuli, smooth and 66 ventral annuli with dot-like microtubercles. Setae *c*2 20 on ventral annuli 12; setae *d* 80 on ventral annuli 25; setae *e* 60 on ventral annuli 48; setae *f* 50 on 10th ventral annuli from rear. Setae *h*1 absent. Female genitalia 15 long, 20 wide, coverflap basally with microtubercles, proximal setae on coxisternum Ⅲ (3*a*) 12 long.

Male: 200 long, 60 wide, genitalia 20 wide, proximal setae on coxisternum Ⅲ (3*a*) 10 long.

Host: *Oryza sativa* Linn.



Figs. 1 – 6 Female adult of *Cheiracus sulcatus* Keifer
1. Dorsal view of female; 2. Coxae and female genitalia; 3. Legs Ⅰ and Ⅱ; 4. Lateral microtubercles; 5. Tarsal empodia; 6. Male genitalia.

Symptoms

Symptoms caused by the feeding of the mite *Cheiracus sulcatus* Keifer is characterized by long rust stripes on the underside of rice leaves (Figs. 7,8,9: C) under microscope, and withered and yellowed leaf tips (Fig. 9: A and B) at a distance. Symptoms are somewhat similar to those of the rice stripe leaf withering disease, which is caused by a virus transmitted by the small brown planthopper, *Laodelphax striatella* (Fallén). Viral inoculation experiments at the Jiangsu Academy of Agricultural Sciences did not prove that this symptom had been caused by the virus, which induces the rice stripe leaf withering disease. The leaf with the symptoms also failed to test positive under standard virus band experiment. We conclude that the symptoms are simply caused by the feeding of the mites.

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广东省新发现一种危害水稻的入侵性瘿螨

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摘要:最近两年一种新的入侵性瘿螨在中国广东省韶关市危害水稻。这种螨曾经在泰国北部被报道过,推测后来传入中国,目前在韶关严重危害水稻。这种螨被鉴定为具沟掌瘿螨 *Cheiracus sulcatus* Keifer,并进行了重新描述和绘图,对危害症状进行了拍照和描述。文章还分析了其扩散风险性,并提出了控制传播的建议。

关键词:具沟掌瘿螨;水稻;瘿螨;入侵种;中国

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